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ABSTRACT

This report presents the evaluation results of the 1979-80 Title I program in grades one, two, three and seven in the District of Columbia Public School system. Part One describes program objectives and services and the evaluation design and procedures. A description of the population served by Title I is included in Part Two. Achievement gains in student performance are reported for reading and mathematics by grade level. Socioeconomic status, physical handicaps, and behavioral problems of Title I students are discussed in relation to academic achievement. Numbers of students held back one or more years are also given. It is reported that Title I program objectives for 1979-80 were exceeded in mathematics at all grades, while the objective for reading was met in grade one and exceeded in all other grades. An appendix explains the use of normal scale equivalents in the assessment of programs based on different test data. (JCD)

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ED213797

District of Columbia Public Schools
Evaluation of the ESEA Title I Program

Final Evaluation Report 1979-80

James T. Guines, Acting Superintendent of Schools May 1981

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UD 022141

District of Columbia Public Schools

Evaluation of the ESEA Title I Program

FINAL EVALUATION REPORT

1979-80

Prepared by
Division of Research and Evaluation
May 1981

District of Columbia Public Schools

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Table of Contents

	Page
LIST OF FIGURES	iv
LIST OF TABLES	v
INTRODUCTION	1
PART I	
Program Description	2
Evaluation Design	13
Results	24
Conclusions and Implications	36
PART II	
Profile of the Title I Child	37
APPENDIX A	56

LIST OF FIGURES

Figure		Page
1	ASSUMED TITLE I EFFECT IN MODEL A	16
2	PRE AND POSTTEST PERFORMANCE OF TITLE I STUDENTS AND IMPROVEMENT (PROGRAM) OBJECTIVES, 1979-80 ...	31

LIST OF TABLES

Table		Page
1	TITLE I LABORATORY STAFFING PLAN	6
2	SAMPLE LABORATORY SCHEDULE FOR MONDAY THROUGH THURSDAY ..	7
3	NUMBER OF TITLE I STUDENTS SERVED IN LABORATORY PROGRAM GRADES ONE, TWO, THREE AND SEVEN	12
4	FORM AND LEVEL OF THE CTBS ADMINISTERED TO TITLE I STUDENTS DURING THE FALL AND SPRING TESTING PERIODS (1979-80)	18
5	NUMBER OF STUDENTS IN EACH FILE	20
6	DISTRIBUTION OF THE NUMBER AND PERCENT OF STUDENTS SERVED BY THE TITLE I PROGRAM IN 1979-80 AND THE NUMBER AND PERCENT OF CASES INCLUDED IN ACHIEVEMENT ANALYSIS	22
7	ESTIMATED TREATMENT EFFECTS ON READING AND MATHEMATICS ACHIEVEMENT AMONG FIRST GRADERS RECEIVING TITLE I SUPPLEMENTARY INSTRUCTIONAL SERVICES (SY 1979-80)	25
8	ESTIMATED TREATMENT EFFECTS ON READING AND MATHEMATICS ACHIEVEMENT AMONG SECOND GRADERS RECEIVING TITLE I SUPPLEMENTARY INSTRUCTIONAL SERVICES (SY 1979-80)	26
9	ESTIMATED TREATMENT EFFECTS ON READING AND MATHEMATICS ACHIEVEMENT AMONG THIRD GRADERS RECEIVING TITLE I SUPPLEMENTARY INSTRUCTIONAL SERVICES (SY 1979-80)	28
10	ESTIMATED TREATMENT EFFECTS ON READING AND MATHEMATICS ACHIEVEMENT AMONG SEVENTH GRADERS RECEIVING TITLE I SUPPLEMENTARY INSTRUCTIONAL SERVICES (SY 1979-80)	30
11	TITLE I PROGRAM IMPACT ON READING ACHIEVEMENT: COMPARISON OF ESTIMATED TREATMENT EFFECT (IN NCES) AMONG STUDENTS RECEIVING TITLE I SERVICES 1977-78 THROUGH 1979-80	33
12	TITLE I PROGRAM IMPACT ON MATHEMATICS ACHIEVEMENT: COMPARISON OF ESTIMATED TREATMENT EFFECT (IN NCES) AMONG STUDENTS RECEIVING TITLE I SERVICES 1977-78 THROUGH 1979-80	35
13	NUMBER OF STUDENTS RECEIVING TITLE I SUPPLEMENTARY INSTRUCTIONAL SERVICES IN PUBLIC SCHOOLS AND NUMBER OF STUDENTS WITH COMPLETED SIF'S BY GRADE LEVEL (1979-80) (UNDUPLICATED)	38

LIST OF TABLES (continued)

Table		Page
14	PERCENTAGE DISTRIBUTION OF TITLE I LABORATORY STUDENTS BY GRADE AND BY SEX (1979-80)	39
15	TITLE I STUDENTS ENROLLED IN THE SAME CLASSROOM ALL YEAR BY GRADE (1979-80)	40
16	MOST COMMON REASONS WHY TITLE I STUDENTS WERE NOT ENROLLED FOR THE FULL YEAR (1979-80)	41
17	PERCENTAGE OF TITLE I STUDENTS RATED AS HAVING A MODERATE TO HIGH DEGREE OF NEED FOR SERVICES IN READING AND MATHEMATICS (1979-80)	43
18	TITLE I STUDENTS RECEIVING READING LABORATORY SERVICES BY GRADE LEVEL (1979-80)	44
19	STUDENTS SERVED IN THE TITLE I MATHEMATICS LABORATORY PROGRAM BY GRADE LEVEL (1979-80)	45
20	STUDENT DISTRIBUTION BY GRADE IN THE TITLE I READING AND MATHEMATICS TUTORIAL PROGRAM (1979-80)	45
21	NUMBER OF STUDENTS SERVED IN THE TITLE I BILINGUAL AND PUPIL PERSONNEL SERVICE COMPONENTS BY GRADE LEVEL (1979-80)	46
22	PERCENTAGE OF TITLE I STUDENTS WITH ECONOMIC NEED (1979-80)	47
23	PERCENTAGE OF TITLE I STUDENTS FOR WHOM ABSENTEEISM ADVERSELY INFLUENCED EDUCATIONAL PROGRESS (1979-80)	47
24	PERCENTAGE OF TITLE I STUDENTS WITH BEHAVIORAL PROBLEMS THAT INTERFERE WITH THEIR EDUCATIONAL PROGRESS (1979-80)	48
25	GRADE LEVEL SUMMARY OF TITLE I STUDENTS WITH SUPPORTIVE FAMILIES (1979-80)	49
26	PERCENTAGE OF TITLE I STUDENTS, BY GRADE, WITH PHYSICAL OR HEALTH PROBLEMS WHICH INFLUENCE ACADEMIC PROGRESS (1979-80)	50
27	PERCENTAGE OF TITLE I STUDENTS WITH EVIDENCED PATTERNS OF COMMUNICATION	51
28	PERCENTAGE OF TITLE I STUDENTS WITH KINDERGARTEN EXPERIENCE (1979-80)	52

LIST OF TABLES (continued)

Table		Page
29	THE NUMBER OF TITLE I STUDENTS REPEATING THE PRESENT GRADE (1979-80)	53
30	GRADE RETENTION OF TITLE I STUDENTS IN EARLIER GRADES (1979-80)	54
31	SUMMARY OF TEACHER RATING OF TITLE I STUDENT BACKGROUND PREPARATION FOR SUCCESSFUL CLASSROOM EXPERIENCES BY GRADE (1979-80)	55

INTRODUCTION

The District of Columbia Public Schools ranked as the tenth largest U.S. city school system in 1979. In October 1979 the District of Columbia Public Schools (DCPS) enrollment was 113,858 students. The school population was 94.6 percent Black, 3.77 percent white, and 1.63 percent other nonwhite students. Using the criterion of eligibility for free lunches, 49 percent of the school population experienced economic disadvantage.

For the past 16 years DCPS has been operating a program of supplemental services for the school district's educationally deprived students. This program, the ESEA Title I Program, is an outgrowth of the Elementary and Secondary Education Act of 1965. The Act authorizes the appropriation of grant funds to public education agencies to provide programs of supplemental instruction to meet the special needs of educationally deprived children living in areas highly concentrated with low-income families. The purpose of this document is to report results of the evaluation of the 1979-80 Title I Program in grades one, two, three and seven in public elementary and secondary schools. Included are Part I: a discussion of program goals and services, description of the evaluation design, presentation and discussion of results and Part II: a description of the population served by the Title I Program.

PART I

PROGRAM DESCRIPTION

Goals and Objectives

The overall goal of the Title I Program in the District of Columbia Public Schools is to provide assistance to educationally disadvantaged students that will improve their educational performance, psychomotor skills and affective behavior. The educational assistance provided to Title I students is intended to increase the skills and competencies of identified students in reading-language and mathematics accompanied by improved affective and psychomotor behavior. Each project component for the Title I Program has stated objectives that represent in more precise terms the means by which the overall program goal is to be achieved and the expected student outcomes are to be realized.

The overall program goal and objectives are an outgrowth of the assessed student needs. For the 1979-80 program, determination and ranking of student needs were based on data supplied from the spring 1979 Student Information Form (SIF), results from standardized and criterion-referenced tests, prior program evaluation reports, and appropriate research literature. The ranked needs for students from kindergarten through grade three and grade seven are provided below:

1. Low reading achievement
2. Low mathematics achievement
3. Less than adequate language expression
4. Poor self-concept
5. Learning-support needs related to absenteeism, health, and domestic concerns
6. Developmental lag in psychomotor skills.

Program objectives developed in response to low achievement state the anticipated gains students will achieve in reading and mathematics.

The program objectives [1]/ are listed below:

Expected Achievement in Reading

Grade 1

Given eight months of Title I supplementary instructional services in the Title I reading laboratory, the average achievement of students in grade one will increase in percentile status relative to their peers in the national norms as measured by standardized reading achievement tests. This increase corresponds to a gain of one normal curve equivalent (NCE).

Grade 2

Given eight months of Title I supplementary instructional services in the Title I reading laboratory, the average achievement of students in grade two will increase in percentile status relative to their peers in the national norms as measured by standardized reading achievement tests. This increase corresponds to a gain of three NCEs.

Grade 3

Given eight months of Title I supplementary instructional services in the Title I reading laboratory, the average achievement of students in grade three will increase in percentile status relative to their peers in the national norms as measured by standardized reading achievement tests. This increase corresponds to a gain of three NCEs.

Grade 7

Given eight months of Title I supplementary instructional services in the Title I reading laboratory, the average achievement of students in grade seven will increase in percentile status relative to their peers in the national norms as measured by standardized reading achievement tests. This increase corresponds to a gain of three NCEs.

Expected Achievement in Mathematics

Grade 1

Given eight months of Title I supplementary instructional services in the Title I mathematics laboratory, the average achievement of students in grade one will increase in percentile status relative to their peers in the national norms as measured by standardized mathematics achievement tests. This increase corresponds to a gain of three NCEs.

[1]/Amended on January 29, 1980.

Grade 2

Given eight months of Title I supplementary instructional services in the Title I mathematics laboratory, the average achievement of students in grade two will increase in percentile status relative to their peers in the national norms as measured by standardized mathematics achievement tests. This increase corresponds to a gain of five NCEs.

Grade 3

Given eight months of Title I supplementary instructional services in the Title I mathematics laboratory, the average achievement of students in grade three will increase in percentile status relative to their peers in the national norms as measured by standardized mathematics achievement tests. This increase corresponds to a gain of five NCEs.

Grade 7

Given eight months of Title I supplementary instructional services in the Title I mathematics laboratory, the average achievement of students in grade seven will increase in percentile status relative to their peers in the national norms as measured by standardized mathematics achievement tests. This increase corresponds to a gain of five NCEs.

The identified needs of Title I students put these students at an educational disadvantage in a traditional school environment that stresses reading and mathematics concept/skill development. The recognized needs of Title I students suggest that classroom and resource teachers need to be equipped with specialized skills in order to fulfill the recognized needs of the Title I student.

The strategy developed to address the learning needs of Title I children includes three instructional interventions. These interventions include: 1) the laboratory program; 2) the tutorial program; and 3) the classroom program. Each of the interventions is intended to facilitate academic achievement that results in increased competencies and skills and lessens or removes previously identified learning deficiences.

The primary or most fundamental service provided to Title I students is the program of supplementary instruction in reading and mathematics.

The ranked needs of students based upon SIF data and research literature suggest the need for support services that will enable Title I students to maximize the benefits received through supplemental instruction. The supplementary instructional program in reading and mathematics, in addition to other support services, is discussed in the next sections of this report.

Instructional Services

The District of Columbia Public Schools Title I Program serves both elementary and secondary school students. Each level of the educational program has an instructional design appropriate for that particular level. The two instructional designs, elementary and secondary, are discussed separately in this section.

The Elementary School Instructional Design

The elementary school instructional design addresses some of the needs of Title I children in kindergarten through the third grade. The educational needs identified for these children in reading-language require provision of supplementary instruction in receptive and expressive language. Supplementary instruction in mathematics includes the development of broad concepts in mathematics, and the development of motivational goals.

The reading and mathematics laboratory program serves Title I students in grades one through three who are most in need of supplemental instruction. The teaching staff allocated to the laboratory program is based upon the number of students to be served in the lab. A general staffing plan for the reading and mathematics laboratory is presented in Table 1.

Table 1

TITLE I LABORATORY STAFFING PLAN

Laboratory	Teachers assigned to reading and mathematics labs based on number students to be served		
	Less than 99 Students	100-149 Students	150 or more Students
Reading	1	2	3
Mathematics	1	1	2

Each reading and mathematics laboratory serves approximately 50 identified Title I students in approximate groups of 10 for a complete school year. Students assigned to the Title I reading and mathematics laboratory receive 45 minutes of supplementary instruction each day. A sample laboratory program is provided in Table 2.

Table 2

SAMPLE LABORATORY SCHEDULE FOR MONDAY THROUGH THURSDAY

Time Blocks	SY 1979-80
9:00 - 9:15	Team Planning
9:15 - 10:00	Group A
10:00 - 10:30	Team Planning
10:30 - 11:15	Group B
11:15 - 12:00	Group C
1:05 - 1:50	Group D
1:50 - 2:35	Group E
2:35 - 3:00	Tutorial Program Preparation

The tutorial program serves students in grades one through three who are served in the labs and have parental permission to participate in tutorial services. Supplementary services in the tutorial program are provided before and after regular school hours on Monday through Thursday. Reading, language, and mathematics are the content areas for tutorial assistance. Tutorial activities are based on the individual tutorial prescription developed for each child in the program and may include assistance with homework assignments. The tutorial program is staffed primarily by the educational aides. Other school personnel, such as the classroom teacher, laboratory teacher, principal, and other instructional personnel, serve as a resource to the educational aide.

The classroom component serves all identified Title I students in kindergarten through grade three. Supplemental instruction is provided by the classroom teacher within the regular classroom. Students enrolled in the program receive supplementary instruction in reading and mathematics for one and one-half hours per week. The curriculum for the classroom program is centered around the Curriculum Handbook developed by the Title I staff. The supports provided for implementation of the program in grades one, two and three include the services of a Title I Program assistant and parent partners.

The Secondary Level Instructional Design

At the secondary level, supplementary instructional services are provided to identified Title I students in the seventh grade. The services include reading and mathematics laboratory programs and a tutorial program.

The laboratory program is the major instructional intervention at the secondary level. Daily instruction in reading and/or mathematics is provided to those students considered to have the greatest need for such services. Each period of laboratory instruction is 55 minutes in duration. The individualized instruction that characterizes the laboratory program is skills oriented and uses a diagnostic-prescriptive approach.

The staffing for the reading-language and mathematics program at the secondary level is based primarily on two laboratory teams: 1) reading team, and 2) mathematics team. Each laboratory team consists of a teacher and an aide with additional support services provided by parent partners assigned to each school.

Noninstructional Services

Additional services provided by the Title I program include support services that are intended to help Title I students derive the maximum benefit from the program of supplemental instruction. The additional support services given to Title I students include:

1. Pupil Personnel Services (except in seventh grade)

   The pupil personnel services in elementary schools are provided by a team composed of a pupil personnel worker, pupil personnel aide, clinical psychologist, and a psychiatric social worker.

   The Urban Service Corps acts in conjunction with Pupil Personnel Services and other school agencies to insure that Title I students in need of shoes, clothing, eyeglasses, or hearing aids will be provided with these necessities.

2. Student Enrichment and Media Services

   The enrichment component seeks to expand and extend the student's experiential background and help him to gain additional reinforcement in reading and mathematics skills through the performing and visual arts, and field trip experiences.

   Title I media center provides and maintains instructional audio-visual materials, and trained personnel for instruction and support in the proper use of equipment and supplies.

These additional support services are intended to ameliorate some of the problems of students that are often hindrances to the learning process.

Target Population

The participation of students in the Title I program is based on three factors: 1) identification of schools eligible for Title I services; 2) determination of Target grades; and 3) selection of eligible students.

1. Identification of Title I Schools

   The eligibility criteria for school attendance areas adopted for use by the Title I program and approved by the Board of Education are consistent with the selection criteria recommended by the Title I Citywide Advisory Council for FY 1979. The selection criteria for attendance areas are based on an income factor derived from the 1970 census and the number of children eligible for free lunch. Both factors -income and free lunch eligibility -are weighted. The income factor is weighted 40 percent and the free lunch eligibility is weighted 60 percent. The determination of eligible school attendance areas is based on the number and percent of economically disadvantaged students enrolled according to the procedure outlined in the handbook for local Title I officials, "ESEA Title I: Selecting Target Areas".

2. Grades Served

   The Title I Program serves public elementary and secondary schools in kindergarten through grade three and seven.

3. Identification of Title I Students
   (Grades one, two, three and seven)

   The identification of individual students for participation in the Title I Program is based upon the following criteria:

   a) Standardized Achievement Test Performance

      Students in grades two, three, and seven who rank at or below the 50th percentile on the Comprehensive Tests of Basic Skills in reading and mathmatics and students at the first grade who rank at or below the 5th stanine in mathematics and the 50th percentile in reading on the Metropolitan Readiness Test;

   b) Grade Level Retention

      Students retained in the current grade only.

c) Over Age for Grade Level

Students who are at least two years older than their peers;

d) Teacher recommendation with documentation and principal approval.

Students are ranked separately for reading and mathmatics by grade, classroom and school starting with the student with the lowest test score. Then selection is made based on greatest need for service.

During school year 1979-80, a total of 6,365 students received supplemental instruction in reading, and 4,864 students were provided with supplemental instruction in mathematics. A summary of the number of students receiving Title I supplementary instructional services, by grade, is presented in Table 3.

Table 3

NUMBER OF TITLE I STUDENTS SERVED IN LABORATORY PROGRAMS,
GRADES ONE, TWO, THREE AND SEVEN
1979-80

Summary Data

Category of Service	Number of students by grade level				
	1	2	3	7	Total*
Mathematics Laboratory	1,388	1,078	1,327	1,071	4,864
Reading Laboratory	1,674	1,510	1,879	1,302	6,365

Source: Service data provided by the Title I Program Office and compiled by the Division of Research and Evaluation.

*Of the numbers shown, 2,385 students received services in both reading and mathematics. (See Table 13, page 38.)

EVALUATION DESIGN

Title I program evaluation is conducted to determine the extent to which program participation resulted in improved academic performance in grades one, two, three and seven in public elementary and secondary schools.* To make that determination, students' achievement following participation must be measured and then compared against the achievement which might have been expected if they had not participated in the program. While assessment of post-program achievement can be made on the basis of post-program achievement test scores, determination of achievement which could have been expected without program participation is less straightforward. For the purposes of evaluating the Title I Program, of The District of Columbia Public Schools the evaluation design utilized for determining the treatment effect, or the impact on the reading and the mathematics achievement of program participants, is the norm-referenced model generally referred to as Model A. This model permits assessment of the treatment effect through use of nationally normed achievement tests. A brief overview of the Model A design is presented in the following section.

*Parts of this chapter are an adaptation of the section under the same title which appeared in Final Model A Report: Evaluation of Program Impact on Reading and Mathematics Achievement, 1978-79 prepared by the NTS Research Corporation for D.C. Public Schools.

Model A Design [2]

Model A is one of several design alternatives developed by the U.S. Office of Education to facilitate improvement in the evaluation of Title I programs throughout the nation. It is used in situations when a student population is not available to serve as a comparison group to assess treatment effects. Additionally, Model A is sufficiently flexible to permit adaptations appropriate for the unique characteristics of widely disparate school systems. [3]

The Model A evaluation design is structured as follows. A normed achievement test is administered to recipients of Title I Program services (i.e., the treatment group) prior to their entry into the program and after a specified period of treatment. Pre and posttesting of the treatment group should be conducted at approximately the same time the empirical norming group was tested. This procedure permits determination of the posttest status of the treatment group relative to a representative norm group of children within the same grade level. The norm group hence serves as a no treatment comparison group.

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[2] A comprehensive description of Model A and other designs available for evaluation of Title I programs is presented in Tallmadge, G., and Wood, C. User's Guide: ESEA Title I evaluation and reporting system. Mountain View, CA: RMC Research Corporation, October 1976. The version of Model A described here is A1, which utilizes norm-referenced tests. A2 uses criterion-referenced tests.

[3] For example, considerable latitude exists in the choice of instruments, logistics of test administration, etc.

The basic assumption of this design is that students as a group, if provided comparable instruction, tend to maintain their achievement level relative to the norming group throughout the school year because the group is likely to experience normal growth during that period. That is, the percentile ranking of the average posttest score would correspond to the percentile ranking of the average pretest score (see Figure 1). If this result occurs, the students as a group are considered to have achieved as expected. Conversely, if the percentile ranking of the average posttest scores exceeds the percentile ranking of the average pretest score, the students as a group are considered to have exceeded their expected performance. For students who participate in a Title I Program, the norm-referenced model assumes that performance which exceeds expectations is attributable to the supplementary reading and mathematics instruction provided by the Title I Program. Within this framework, the treatment effect attributed to the Title I Program is the observed posttest performance minus the expected (no-treatment) posttest performance, which can be formulated as follows:

Treatment effect = Observed Title I posttest (treatment) performance - Expected posttest (no-treatment) performance

In this report, results are presented in terms of achievement scores that have been transformed from percentiles into normal curve equivalent (NCE) scores. [4]/ The expected posttest no-treatment performance of the Title I students is their average pretest achievement NCE score, and the effect of program participation is indicated by the differences between the average pretest and average posttest achievement NCE scores of program participants.

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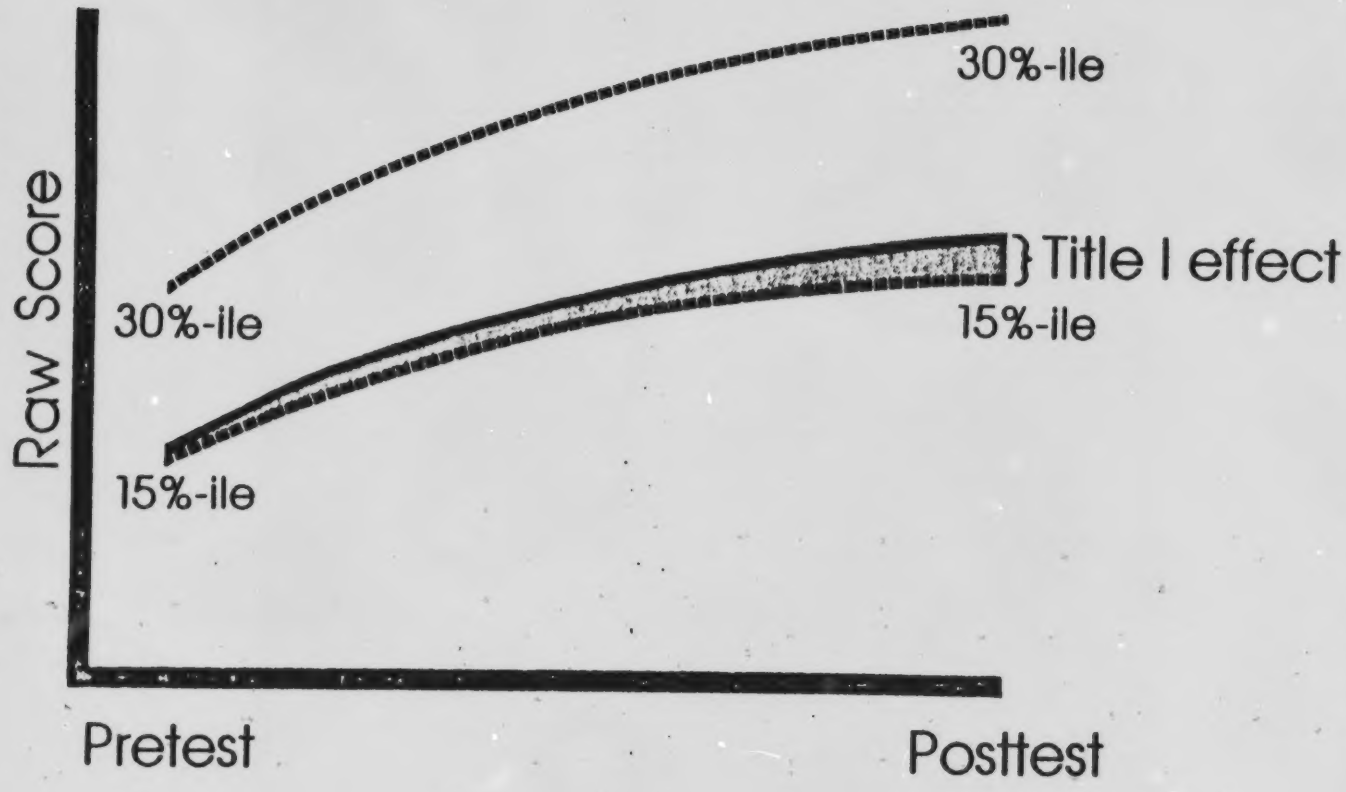
[4]/ Appendix A provides a discussion of NCE scores.

Figure 1

Assumed Title I Effect in Model A



Use of Model A to estimate program impact requires that the following assumptions be satisfied:

1. The pretest was not used to select program participants;

2. Achievement tests were administered at times corresponding to the periods when the test was normed;

3. The same form and level of the achievement test were used for both pretest and posttest;

4. Analysis was limited to students for whom both pretest and posttest scores were available;

5. At least two-thirds of program participation occurred in the period between the pretest and posttest.

For the most part, the data sets utilized in the Model A anaylsis met these assumptions. Program participants were selected based on the previous year's posttest achievement scores as well as on other factors. In connection with time of test administration, no fall empirical norms exist for grades two, three, and seven of the CTBS; consequently, extrapolated norms were used for these grades. [5]/ For grade one in the fall, and grades one, two, three and seven in the spring, empirical norms are available and test administration occurred within the required limits of test's empirical norming periods.

Table 4 indicates the form and level of the CTBS administered to Title I students during the fall and spring testing periods. As this information indicates, test levels administered to each grade remained the same for pretest and posttest, thus fulfilling part of the third Model A assumption. In regard to test forms, however, a change was made from pretest and posttest in the form administered to grade seven. Technically, therefore, this assumption of the model was not met for this grade, although according to the

[5]/ While this procedure of using extrapolated norms is not ideal, it is the only alternative with tests for which empirical norming at a particular time has not occured.

test publisher Form S and T are essentially equivalent because they were statistically equated by the publisher in 1975. 6/

Table 4

FORM AND LEVEL OF THE CTBS ADMINISTERED TO TITLE I STUDENTS DURING THE FALL AND SPRING TESTING PERIODS (1979-80)

Grade	Fall (pretest) Form	Level	Spring (posttest) Form	Level
1	S	B	S	B
2	S	C	S	C
3	S	1	S	1
7	S	3	T	3

6/ Test coordinator's handbook (expanded edition): Comprehensive Test of Basic Skills. Monterey, CA: CTB/McGraw-Hill, 1976.

Instrumentation

Two instruments were utilized to collect data required for conducting of the Model A analysis for the D.C. Title I Program. Achievement scores were derived from the Comprehensive Tests of Basic Skills (CTBS), while information concerning students' Title I program eligibility and participation, grade level, etc., was derived from the Student Information Form (SIF), a teacher-completed questionnaire developed specifically for the D.C. Title I Program. A brief description of these instruments is presented in this section.

Comprehensive Tests of Basic Skills (CTBS). The CTBS is a group-administered series of achievement tests for kindergarten through twelfth grade students. The CTBS achievement battery is designed to measure systematically, on a national basis, attainment of knowledge in reading and mathematics in addition to those skill areas which the publishers believe to be prerequisite to effective studying and learning in school.

The CTBS for students in kindergarten through grade two assesses three basic skills areas: reading, language arts, and mathematics. Among the reading subtests administered at various grade levels were word recognition, letter sounds, reading comprehension and vocabulary. Language arts subtests included language expression, spelling, and language mechanics; mathematics subtests included computation and concepts and applications.

The CTBS for third and seventh grade students includes five basic skills areas, three of which, reading, language arts, and mathematics, were administered for this evaluation. Reading subtests included reading comprehension; language arts subtest included spelling, language mechanics and language expression; and mathematics subtests included computation and concepts and applications.

Student Information Form (SIF). The SIF was developed to collect information from teachers about individual students concerning their background, home environment, and other nonacademic and demographic factors as well as academic factors. This form is reviewed and revised each year. School-related information collected on the SIF includes grade levels and grades repeated, Title I eligibility and participation, school attendance information, health status, and language and communications problems. Other information collected includes sex, behavioral patterns (withdrawn behavior, aggressiveness, etc.) and level of family support manifested.

Description of the Student Population

Data analyzed for this report were collected for students in grades one, two, three, and seven in the Washington, D.C. public schools during the 1979-80 academic year. The Model A analysis required that the following data be available for each student included in the analysis: (1) pretest administration of the CTBS; (2) posttest administration of the CTBS; and (3) teacher-reported data on the SIF for each individual student. Any student for whom any of these data was missing was omitted from the analysis. Table 5 shows the number of students with data for each source.

Table 5

NUMBER OF STUDENTS[a] IN EACH FILE

File	Number of cases
SIF	20,600
CTBS pretest	19,537
CTBS posttest	16,208

[a]Includes both Title I and Non-Title I students.

In addition, to be included in this analysis, at least two-thirds of supplementary instruction provided to these students in reading and mathematics occurred between the two testing periods.

In order to increase the number of students that could be matched in all three files, a computer listing of the name, grade, identification number, teacher name, and school for each student was printed as it appeared in the pretest file (CTBS tests administered Fall 1979) and distributed to classroom teachers in the spring 1980. The teachers were instructed to enter this same information (except for teacher name) on the SIF and CTBS test booklets completed in the spring 1980 just as it appeared on the pretest file.

Overall, this strategy netted slightly more matched cases than the percentage available for analysis in the previous year: 52 percent in reading and 51 percent in mathematics as compared to 48 and 44 percents respectively in 1978-79; however, this slight improvement was the result of a substantial increase in matched cases at the third and seventh grade levels. The percent of matched cases in grades one and two declined in three out of four comparisons. Table 6 shows the number and percentages of Title I students by grade level for whom matched data were available for 1979-80 school year.

Table 6

DISTRIBUTION OF THE NUMBER AND PERCENT OF STUDENTS SERVED BY THE TITLE I PROGRAM IN 1979-80 AND THE NUMBER AND PERCENT OF CASES INCLUDED IN ACHIEVEMENT ANALYSIS

Grade	Reading Served			Math Served		
	Students served[a]	Cases available for[b] analysis		Students served[a]	Cases available for[b] analysis	
	N	N	%	N	N	%
1	1,674	905	54	1,388	717	52
2	1,510	844	56	1,078	612	57
3	1,879	1,161	62	1,327	796	60
7	1,302	406	31	1,071	335	31
Total	6,365	3,316	52	4,864	2,460	51

[a]Source: Service data provided by Title I program office.

[b]Includes only students with three-way matches (Fall CTBS score, Spring CTBS score, and Student Information Form).

The gains in reading achievement for the first grade are based on data from 54 percent of the total first grade student population served. The number of participants included in the analysis is 905 students from a total population of 1,674 students who were actually served by the program.

The gains in mathematics achievement by Title I first grade students are based on an analysis of 52 percent of the total first grade student population served in the program. The first grade mathematics programs served 1,388 students, with 717 student participants included in the analysis.

The Title I reading program for the second grade served 1,510 students; the number of students included in the analysis was 844. The number of students included in the analysis represents 56 percent of those second grade students who received supplemental instructional services by the Title I program.

The number of second grade students included in the analysis of achievement in mathematics was 612. This figure, represents 57 percent of the total population of 1,078 students served in the Title I second grade mathematics program.

In the third grade reading program 1,879 Title I students were served. The number of students included in the analysis was 1,161, or 62 percent of the students served by the program. The third grade mathematics program served 1,327 students; 60 percent or 796 students were included in the analysis.

The Title I reading program for the seventh grade served 1,302 students. The number of students included in the analysis was 406 or 31 percent of the number of students served. The Title I mathematics program for the seventh grade served 1,071 students. The number of students included in the analysis was 335 or 31 percent of the number of students served.

RESULTS

As in previous school years, program planners for the Title I Program in the District of Columbia Public Schools established program objectives for SY 1979-80 that estimated the anticipated level of student achievement in reading and mathematics by grade level. The anticipated level of achievement is expressed as a gain in normal curve equivalents (NCE's).

Achievement Gains Among First Graders: Reading

The objective for the first grade student achievement in reading is presented below:

> Grade One
>
> Given eight months of Title I supplementary instructional services in the Title I reading laboratory, the average achievement of students in grade one will increase in percentile status relative to their peers in the national norms as measured by standardized reading achievement tests. This increase corresponds to a gain of one normal curve equivalent (NCE).

As shown in Table 7, students enrolled in the Title I reading program at the first grade level had an average pretest score of 41.3 NCE's when tested during the fall test period. The posttest mean was 42.4 NCE's. The expected level of achievement of one NCE was reached as the mean gain in NCE's was 1.1.

Achievement Gains Among First Graders: Mathematics

The objective for students enrolled in the first grade mathematics program states the level of expected student achievement for students enrolled at that level. The program objective for first grade mathematics is given below:

> Grade One
>
> Given eight months of Title I supplementary instructional services in the Title I mathematics laboratory, the average achievement of students in grade one will increase in percentile status relative to their peers in the national

norms as measured by the standardized mathematics achievement tests. This increase corresponds to a gain of three NCE's.

First grade students enrolled in the Title I mathematics program had a mean score of 42.7 NCE's on the pretest given in the fall as shown in Table 7. The mean score for the group on the spring posttest was 49.1 NCE's. The mean gain for the group was 6.4 NCE's. The expected level of student achievement was met and surpassed.

Table 7

ESTIMATED TREATMENT EFFECTS ON READING AND MATHEMATICS ACHIEVEMENT AMONG FIRST GRADERS RECEIVING TITLE I SUPPLEMENTARY INSTRUCTIONAL SERVICES (SY 1979-80)

Subject Area	N	Average Pretest Score		Average Posttest Score		Estimated Treatment Effect (NCE)
		NCE	Percentile	NCE	Percentile	
Reading	905	41.3	33	42.4	35	1.1
Mathematics	717	42.7	37	49.1	48	6.4

Achievement Gains Among Second Graders: Reading

The reading program objective for the second grade is stated below:

Grade Two

Given eight months of Title I supplementary instructional services in the Title I reading laboratory, the average achievement of students in grade two will increase in percentile status relative to their peers in the national norms as measured by standardized reading achievement tests. This increase corresponds to a gain of three NCEs.

As shown in Table 8, second grade students on the fall pretest had a mean of 23.8 NCE's. The results of the spring posttest revealed a mean score for the group of 31.5 NCE's. The estimated gain for the group was 7.7 NCE's. The 7.7 estimated gain is the largest gain by any group of students tested in the Title I reading program. The anticipated gain as expressed in the objective for the second grade was 3 NCE's.

Achievement Gains Among Second Graders: Mathematics

The objective for the Title I second grade mathematics program is presented below:

> Grade Two
>
> Given eight months of Title I supplementary instructional services in the Title I mathematics laboratory, the average achievement of students in grade two will increase in percentile status relative to their peers in the national norms as measured by standardized mathematics achievement tests. This increase corresponds to a gain of five NCEs.

The group of second graders at the time of the fall pretest had a mean score of 30.8 NCE's as indicated in Table 8. The spring posttest mean was 42.1 NCE's. The estimated gain for the group equals 11.3 NCE's. The gain of 11.3 NCE's is more than double the anticipated gain of 5 NCE's as expressed in the objective.

Table 8

ESTIMATED TREATMENT EFFECTS ON READING AND MATHEMATICS ACHIEVEMENT AMONG SECOND GRADERS RECEIVING TITLE I SUPPLEMENTARY INSTRUCTIONAL SERVICES (SY 1979-80)

Subject Area	N	Average Pretest Score		Average Posttest Score		Estimated Treatment Effect (NCE)
		NCE	Percentile	NCE	Percentile	
Reading	844	23.8	11	31.5	20	7.7
Mathematics	612	30.8	18	42.1	36	11.2*

*The difference of 11.2 instead of 11.3 is due to rounding.

Achievement Gains Among Third Graders: Reading

The Title I program planners established as the level of anticipated achievement for those third grade students enrolled in the Title I reading program a gain of 3 NCE's. The anticipated level of achievement for these students is expressed in the objective stated below:

Grade Three

Given eight months of Title I supplementary instructional services in the Title I reading laboratory, the average achievement of students in grade three will increase in percentile status relative to their peers in the national norms as measured by standardized reading achievement tests. This increase corresponds to a gain of three NCEs.

As presented in Table 9, Title I students who took the reading pretest in the fall had a mean score of 28.9 NCE's. The mean score for the group on the spring posttest was 33.87 NCE's. The mean gain for the group was 4.92 NCE's. The mean score on the posttest represents a gain that exceeds the levels of gain anticipated for the group as expressed in the reading program objective.

Achievement Gains Among Third Graders: Mathematics

The Title I third grade mathematics program anticipated that those students enrolled in the program would experience an overall or group increase in achievement of at least 5 NCE's. The anticipated level of achievement gain is expressed in the objective for the third grade mathematics program.

Grade Three

Given eight months of Title I supplementary instructional services in the Title I mathematics laboratory, the average achievement of students in grade three will increase in percentile status relative to their peers in the national norms as measured by standardized mathematics achievement tests. This increase corresponds to a gain of five NCEs.

The mean score for the group of Title I third grade student participants in the mathematics program on the fall pretest was 28.71 NCE's as shown in Table 9. The mean for those students included in the posttest was 40.77 NCE's. The posttest score represents a gain of 12.06 NCE's. It would appear that those students included in the analysis of the data for the third grade had more than doubled the anticipated gain of 5 NCE's.

Table 9

ESTIMATED TREATMENT EFFECTS ON READING AND MATHEMATICS ACHIEVEMENT AMONG THIRD GRADERS RECEIVING TITLE I SUPPLEMENTARY INSTRUCTIONAL SERVICES (1979-80)

Subject Area	N	Average Pretest Score		Average Posttest Score		Estimated Treatment Effect (NCE)
		NCE	Percentile	NCE	Percentile	
Reading	1161	28.95	16	33.87	22	4.92
Mathematics	796	28.71	16	40.77	33	12.06

Achievement Gains Among Seventh Graders: Reading

The objective for the Title I seventh grade reading program expresses an anticipated gain of 3 NCE's as a benefit of the supplementary instruction provided to these students. The objective for the seventh grade Title I reading program is stated below:

Grade Seven

Given eight months of Title I supplementary instructional services in the Title I reading laboratory, the average achievement of students in grade seven will increase in percentile status relative to their peers in the national norms as measured by standardized reading achievement tests. This increase corresponds to a gain of three NCEs.

As shown in Table 10, seventh graders in the Title I reading program on the fall pretest had a mean score of 25 NCE's. The mean score on the spring posttest was 30 NCE's. The posttest score indicates that the group achieved a gain of 5 NCE's, thus surpassing the anticipated gain of 3 NCE's.

The gains in reading achievement as measured by the differences between the pretest and posttest scores for the group should be accepted with some reservations. The data upon which the analysis was determined were based on only 31 percent of the student population served. The seventh grade Title I reading program served 1,302 students. The analysis was based on data from 406 student participants.

Achievement Gains Among Seventh Graders: Mathematics

The objective for the Title I seventh grade mathematics program expresses an anticipated gain of 5 NCE's as a result of the supplementary instructional services provided by Title I. The objective for the seventh grade mathematics program is states as:

> Grade Seven
>
> Given eight months of Title I supplementary instructional services in the Title I mathematics laboratory, the average achievement of students in grade seven will increase in percentile status relative to their peers in the national norms as measured by standardized mathematics achievement tests. This increase corresponds to a gain of five NCEs.

As indicated in Table 10, the fall pretest mean score for Title I students in the seventh grade mathematics program was 25.1 NCE's. The mean score on the spring posttest was 34.8 NCE's. The posttest score indicates that the Title I seventh grade students experienced a gain of 9.7 NCE's, thus surpassing the anticipated group gain of 5.0 NCE's. As stated in the previous paragraph, the analysis of data for Title I students in the supplementary instructional program in mathematics experienced a level of achievement that

exceeds the level of anticipated gains. However, due to the small percentage of students included in the analysis, it would be wise to reserve judgment concerning those results that suggest gains in student achievement. The number of students represented in the analysis was 335 or 31 percent of the 1,071 students actually served by the program.

Table 10

ESTIMATED TREATMENT EFFECTS ON READING AND MATHEMATICS ACHIEVEMENT AMONG SEVENTH GRADERS RECEIVING TITLE I SUPPLEMENTARY INSTRUCTIONAL SERVICES (1979-80)

Subject Area	N	Average Pretest Score		Average Posttest Score		Estimated Treatment Effect (NCE)
		NCE	Percentile	NCE	Percentile	
Reading	406	25.0	12	30.1	17	5.1
Mathematics	335	25.1	12	34.8	24	9.8*

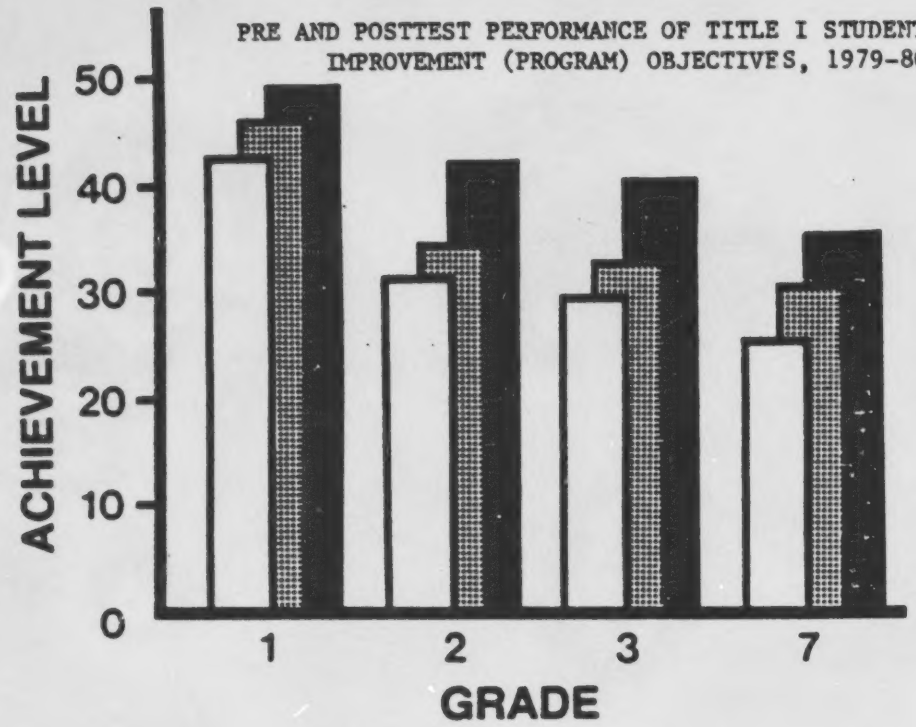
*Difference of 9.8 and not 9.7 is due to rounding.

Posttest Performance Compared to Improvement (Program) Objective

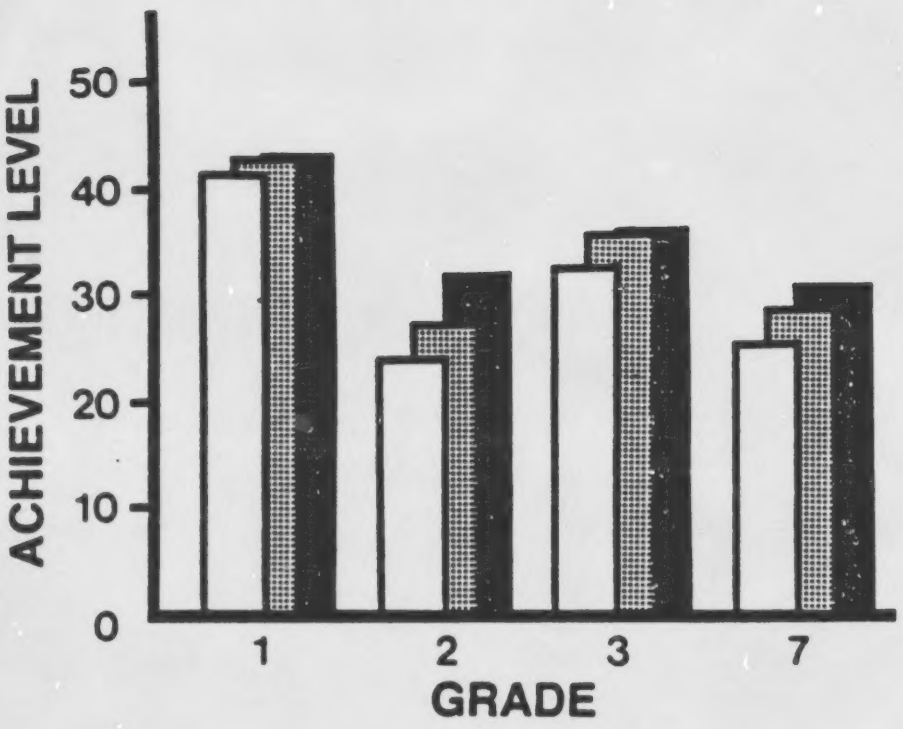
Figure 2 illustrates the 1979-80 pre and posttest performance of Title I students in reading and mathematics as compared to the expected posttest performance represented by the improvement objective. As these data indicate, the actual posttest performance exceeded the improvement objective at all grade levels. The posttest performances were particularly high for mathematics at all grade levels and for grade two reading.

Figure 2

PRE AND POSTTEST PERFORMANCE OF TITLE I STUDENTS AND IMPROVEMENT (PROGRAM) OBJECTIVES, 1979-80



MATHEMATICS



READING

PRETEST AVERAGE

EXPECTED POSTTEST (IMPROVEMENT OBJECTIVE)

ACTUAL POSTTEST AVERAGE

Title I Program Effects From 1977-78 Through 1979-80

Previous Title I Evaluation reports have examined the impact of the Title I program over several school years. This section attempts to continue and extend the examination of the program impact by one year.

Impact of the Title I Reading Program From 1977-78 To 1979-80

As shown in Table 11, students in the Title I first grade reading program have experienced gains in reading each year over the three-year period. The lowest gain, .60, was experienced in 1977-78, and the highest gain 1.66 was in 1978-79. Although Title I gains in reading in grade 1 are not as high as gains demonstrated in the other grades served by Title I, percentile performance levels are the highest at first grade.

Second grade students in the Title I reading program have scored the highest gains in reading achievement of all Title I reading programs by grade, over the three-year period. The largest gains were experienced by the second graders in 1978-79: 9.68 NCE's. The lowest gain in reading achievement for the second grade was in 1979-80, when the mean gain in reading achievement was estimated to be 7.72 NCE's.

The greatest gain in achievement, for third graders was in 1979-80: 4.92 NCE's. The reading gain of third graders has increased by approximately 1 NCE in each of the past two years.

The Title I reading program for the seventh grade has consistently been plagued by low percentages of student representation in the analysis. Consequently, the estimated results of the Title I program impact have been viewed cautiously in attempts to determine the level of program effectiveness. The greatest gain by Title I seventh grade students in the reading program over the three-year period was during 1979-80 when those students experienced a mean gain of 5.12 NCE's. The smallest gain was -.63 NCE's in 1978-79

Table 11

TITLE I PROGRAM IMPACT ON READING ACHIEVEMENT: COMPARISON OF ESTIMATED TREATMENT EFFECT (IN NCEs) AMONG STUDENTS RECEIVING TITLE I SERVICES 1977-78 THROUGH 1979-80

1977-78			1978-79			1979-80		
Grade	N	Mean Gain (NCE)	Grade	N	Mean Gain (NCE)	Grade	N	Mean Gain (NCE)
1	1,649	.60	1	1,277	1.66	1	905	1.06
2	1,365	8.76	2	1,162	9.68	2	844	7.72
3	1,211	2.23	3	1,091	3.08	3	1,161	4.92
7	643	2.82	7	172	-.63	7	406	5.12

representing a loss and is the only occasion in which a mean gain was not demonstrated in any grade during the three-year period.

Impact of the Title I Mathematics Program From 1977-78 Through 1979-80

As shown in Table 12, students in the Title I mathematics program over the three-year period from 1977-80 experienced, by grade level, higher estimated gains in achievement than did their counterparts in the reading program.

Title I first grade students experienced growth in each year of the three-year period. Title I students enrolled in the first grade mathematics program experienced their greatest estimated growth in 1978-79 achieving a mean gain of 7.19 NCE's. The mean gains in 1977-78 and 1979-80 were quite similar: 6.15 and 6.42 NCE's, respectively.

Students in the second grade mathematics program, as in the second grade reading program, experienced greater estimated gains in achievement than any other grade in the Title I program. 1978-79 was the year in which second grade Title I students experienced their greatest gain in estimated achievement: 11.34 NCE's. The lowest gain in estimated achievement was in 1977-78, when the mean gain was 8.50 NCE's.

Title I students in the third grade mathematics program, as did their counterparts in the third grade reading program, seemed to experience their greatest achievement gain in 1979-80: 12.06 NCE's. The lowest gain by third graders was recorded during 1977-78: 8.99 NCE's.

The seventh grade mathematics analysis, like the seventh grade reading analysis, included an exceedingly small proportion of students served. Seventh grade Title I students did, however, experience gains in achievement each year of the three-year period. The greatest gain in estimated achievement occurred during 1979-80, when the students experienced a mean gain of 9.76 NCE's, and the least was in 1978-79 at 2.35 NCE's.

Table 12

TITLE I PROGRAM IMPACT ON MATHEMATICS ACHIEVEMENT: COMPARISON OF ESTIMATED TREATMENT EFFECT (IN NCEs) AMONG STUDENTS RECEIVING TITLE I SERVICES ~~1977-78~~ THROUGH 1979-80

1977-78			1978-79			1979-80		
Grade	N	Mean Gain (NCE)	Grade	N	Mean Gain (NCE)	Grade	N	Mean Gain (NCE)
1	1,578	6.15	1	974	7.19	1	717	6.42
2	1,294	8.50	2	943	11.34	2	612	11.14
3	1,171	8.99	3	720	10.81	3	796	12.06
7	573	6.47	7	97	2.35	7	335	9.76

CONCLUSIONS AND IMPLICATIONS

Implications and Conclusions

The estimated gains in student achievement as a result of the supplementary instruction provided through Title I services suggests that the students in the program benefit from participation in the Title I reading and mathematics components. Program objectives were exceeded in mathematics at all grades. The program objective for reading was met in grade one and exceeded in all other grades. This trend needs to be examined during the analyses of achievement in the future when new tests are administered before changes in the objectives are considered.

Second grade achievement gains in reading, which continue to exceed, by far, the reading gains of other grades, need to be examined more closely to determine if the gains are influenced by factors which can be replicated in the other grades.

During the three-year period from 1977-80, reports of student achievement gains for the seventh grade reading and mathematics program were reported with some reservations due to the low percentage of matched data available for the analysis. The low level of achievement gains observed in some years may be due in part to the small sample sizes. If Title I program planners are to realize a higher reliability in the estimate of program impact, the problems of matched data must be overcome in all grades, but at the seventh grade level in particular.

PART II

PROFILE OF THE TITLE I CHILD

The Profile of the Title I Child is an annual report that is produced for the purpose of aiding Title I program planners in program development for the next school year. The Profile Report is useful in that it provides some insight into the needs, behavior, background, and other data relative to the population to be served.

The information reported is obtained through the use of a questionnaire completed by classroom and Title I laboratory teachers. The questionnaire, called the Student Information Form (SIF), focuses on some descriptive characteristics of Title I students. The SIF was developed specifically for fulfilling some of the planning data needs of the District of Columbia Public Schools Title I Program and for providing evaluation data required by Federal guidelines. It is distributed in the spring to classroom teachers of Title I students at the elementary level and to Title I laboratory teachers at the secondary level. Much of the information collected through the SIF is based on the teacher's perception of the student.

This report focuses on the public school students served in either the Title I reading or mathematics laboratory components in 1979-80, grades one, two, three and seven. It is organized in four sections: 1) program participation; 2)program services provided; 3) factors that influence educational progress; and 4) student background information.

Program Participation

During SY 1979-80, the Title I Program of the District of Columbia Public Schools served 8,844 students in grades one through three and in grade seven in either reading or mathematics labs or both.

The level of student participation as expressed in the 8,844 figure was compiled from the records of laboratory teachers. Data for the Profile report are based upon the number of students for whom an SIF was completed by

teachers. The number of students by grade level and the number and percent of Title I students with a completed SIF are shown in Table 13.

Table 13

NUMBER OF STUDENTS RECEIVING TITLE I SUPPLEMENTARY INSTRUCTIONAL SERVICES IN PUBLIC SCHOOLS* AND NUMBER OF STUDENTS WITH COMPLETED SIF'S BY GRADE LEVEL (1979-80)
(UNDUPLICATED)

Grade	Number of students served	Number of students with SIF	Percent with SIF
1	2,379	1,838	77
2	2,062	1,599	76
3	2,613	2,104	81
7	1,790	1,476	82
Total	8,844	7,017	

*For grades one, two, three and seven, the number served is the total number of students who received laboratory instruction in reading or mathematics or both reading and mathematics during the 1979-80 school year.

Source: Service data provided by Title I Program office.

Although approximately eight percent of the SIF forms did not indicate the sex of the student, the Title I program participation data reveal that more males were enrolled in the program than females in each grade served. Table 14 provides the percentage of male and female participants in Title I laboratory by grade.

Table 14

PERCENTAGE DISTRIBUTION OF TITLE I LABORATORY STUDENTS BY GRADE AND BY SEX (1979-80)

Grade	Males %	Females %	No response %
1	52	41	7
2	54	38	8
3	53	41	6
7	52	40	8

A summary of the number and percentages of Title I students who were enrolled in the same classroom for the entire year is presented in Table 15. At least 86 percent of students in each grade served by the program remained in the same classroom all year. The high percentage of Title I students enrolled in the same classroom suggests that they had the benefit of a continuous educational program.

Table 15

TITLE I STUDENTS ENROLLED IN THE SAME CLASSROOM ALL YEAR BY GRADE (1979-80)

Grade	N enrolled all year	Percentage
1	1,666	91
2	1,389	87
3	1,897	90
7	1,262	86

For various reasons, some students enrolled in the Title I program were not in the program for the entire year. Table 16 indicates the most common reasons and the number and percentage of the Title I population involved. The most common reason given was late entry into the program.

Table 16

MOST COMMON REASONS WHY TITLE I STUDENTS WERE NOT ENROLLED FOR THE FULL YEAR (1979-80)

Grade	REASONS NOT ENROLLED							
	Moved		Late entry into program		Late identification for eligibility		Other	
	N	Percentage	N	Percentage	N	Percentage	N	Percentage
1	14	*	119	7	105	6	120	7
2	8	*	68	4	37	2	130	8
3	11	*	93	4	34	2	111	5
7	64	4	226	15	13	*	65	4

*Less than one percent.

Program Services Provided

Students enrolled in the Title I Program are provided a variety of services. These services are intended to address students' needs in instruction and areas which support learning such as pupil personnel services and cultural enrichment. The instructional needs constitute the major emphasis within the Title I program.

Students enrolled in the Title I program receive supplementary instructional services in reading and mathematics through laboratory, classroom instruction, and tutorial components. Teachers of Title I students were asked to indicate their perception of the priority of each individual student's need for the reading and mathematics supplementary instructional components. Teachers ranked the priority of student need on a continuum from no special need for services to a high degree of need for services. The summary of teacher responses is provided in Table 17. According to teacher perception, at least 75 percent of the students enrolled in the elementary level Title I program (grades one to three) had a moderate to high degree of need for the instructional services offered through the Title I program.

At the secondary level, grade seven, data related to teacher perception of student need for services are less reliable than those results obtained at the elementary level: data for 54 percent of the students in the mathematics laboratory component and approximately 27 percent of the students in the reading component were missing or incomplete.

Table 17

PERCENTAGE OF TITLE I STUDENTS RATED AS HAVING A MODERATE TO HIGH DEGREE OF NEED FOR SERVICES IN READING AND MATHEMATICS (1979-80)

	Reading			Mathematics		
Grade	N	%	% Missing data	N	%	% Missing data
1	1,470	80	4	1,396	76	5
2	1,289	81	6	1,170	73	10
3	1,644	79	7	1,557	74	10
7	974	66	27	568	39	54

Although the reading and mathematics laboratory components are the main instructional services provided to students in the Title I program, additional instructional services are provided through the reading and the mathematics tutorial components. Only students receiving laboratory services are eligible for the tutorial components. Tables 18 through 20 indicate, by grade level, the number and percentage of Title I students who received services in each of the laboratory and tutorial components. In the following tables, students are counted in each component from which they receive a service and will therefore be counted more than once across services. More students participated in the Title I reading laboratory program than in any other instructional support program: 5,228 students. The Title I mathematics laboratory program had the second highest level of student enrollment providing services to 4,077 students.

Table 18

TITLE I STUDENTS RECEIVING READING LABORATORY SERVICES
BY GRADE LEVEL (1979-80)

Grade	Number served	Percentage served
1	1,375	75
2	1,181	74
3	1,594	76
7	1,078	73
Total	5,228	

Table 19

STUDENTS SERVED IN THE TITLE I MATHEMATICS LABORATORY PROGRAM BY GRADE LEVEL (1979-80)

Grade	Number served	Percentage served
1	1,132	62
2	912	57
3	1,168	56
7	865	59
Total	4,077	

Instructional services to Title I students in the reading and mathematics tutorial components involved fewer students than the reading or mathematics laboratory components. The total number of students served was 711 students in the reading tutorial component and 498 students in the mathematics tutorial component. A summary of the number and percentage of students served in both components, by grade level, is shown in Table 20.

Table 20

STUDENT DISTRUBUTION BY GRADE IN THE TITLE I READING AND MATHEMATICS TUTORIAL PROGRAM (1979-80)

Grade	N Reading tutorial served	Percentage served	N Mathematics tutorial served	Percentage served
1	130	7	93	5
2	160	10	106	7
3	192	9	165	8
7	229	16	134	9
Total	711		498	

Learning support services provided to students in the Title I program include Pupil Personnel Services and the Bilingual components. A summary of the number of students served by these components is provided in Table 21.

Table 21

NUMBER OF STUDENTS SERVED BY THE TITLE I BILINGUAL AND PUPIL PERSONNEL SERVICE COMPONENTS BY GRADE LEVEL (1979-80)

Grade	Students served by bilingual N	%	Students served by pupil personnel N	%
1	51	3	351	19
2	10	*	308	19
3	16	*	443	21
7	4	*	48	3
Total	81		1,150	

*Less than one percent.

Factors That May Influence the Educational Progress of Title I Students

Some of the data provided by the SIF, although based on teacher perception, attempt to elicit information regarding those factors that may have a positive or negative impact on the student's educational progress. According to teacher perception, almost one out of every five Title I students sustained economic need that interfered with the student's educational progress as indicated in Table 22.

Table 22

PERCENTAGE OF TITLE I STUDENTS WITH ECONOMIC NEED (1979-80)

Grade	N	%
1	439	24
2	315	20
3	469	22
7	409	28

Student absenteeism was considered by Title I program planners as a factor that could possibly have a negative impact on the student's educational progress. While this may be true, teachers indicated that absenteeism, had adversely impacted upon educational progress for only a small proportion of students as shown in Table 23.

Table 23

PERCENTAGE OF TITLE I STUDENTS FOR WHOM ABSENTEEISM ADVERSELY INFLUENCED EDUCATIONAL PROGRESS (1979-80)

Grade	Short-term absenteeism N	Short-term absenteeism %	Long-term absenteeism N	Long-term absenteeism %
1	332	18	128	7
2	177	11	74	5
3	204	10	75	4
7	175	12	173	12

Some aspects of behavior of Title I students were viewed as factors that could adversely influence the educational progress of Title I students. Those aspects assessed were withdrawn behavior and disruptive behavior. While withdrawn behavior was not judged to be a factor that adversely affected the educational progress of many Title I students, disruptive behavior was viewed as adversely affecting the educational progress of at least one out of every five Title I students. A summary of teacher perceptions of these aspects of behavior is presented in Table 24.

Table 24

PERCENTAGE OF TITLE I STUDENTS WITH BEHAVIORAL PROBLEMS THAT INTERFERE WITH THEIR EDUCATIONAL PROGRESS (1979-80)

Grade	Withdrawn behavior N	Withdrawn behavior %	Disruptive behavior N	Disruptive behavior %
1	252	14	413	22
2	207	13	385	24
3	232	11	523	25
7	78	5	290	20

Parental support of the students' school experience is often a contributing factor in the overall student achievement or in the larger view of the total school experience. The teachers of Title I students who responded to the SIF indicated that, to their knowledge, the parents are largely supportive of the student's effort in the school experience. Table 25 indicates teacher observations of parental support.

Table 25

GRADE LEVEL SUMMARY OF TITLE I STUDENTS
WITH SUPPORTIVE FAMILIES (1979-80)

Grade	Students with supportive families N	%
1	1,326	72
2	1,170	73
3	1,439	68
7	714	48

The health or physical condition of the Title I student was assessed to determine to what extent these factors influence their educational progress. Those factors that were assessed were: speech, emotional, hearing, vision, dental and other health problems. According to teacher assessment, Title I students did not have a major concentration of problems in any of the assessed areas. The problem most frequently cited was emotional. A summary of percentages of Title I students with health problems is presented in Table 26.

Table 26

PERCENTAGE OF TITLE I STUDENTS, BY GRADE, WITH PHYSICAL OR HEALTH PROBLEMS WHICH INFLUENCE ACADEMIC PROGRESS (1979-80)

Grade	Type of Health Problems					
	Speech	Emotional	Hearing	Vision	Dental	Other Health Problems
1	4	9	1	3	1	2
2	4	7	*	5	*	2
3	3	6	1	4	1	2
7	2	4	*	2	*	1

*Less than one percent.

Title I program planners attempted to determine through teacher responses to what extent certain patterns of communication that might affect classroom performance existed in the Title I student population. The patterns of communication that were assessed were: 1) bilingual; 2) aural perception; 3) use of nonstandard English; 4) lack of verbal communication; and 5) the use of a dialect.

As shown in Table 27, lack of verbal communication and nonstandard English were patterns identified most frequently (from 8 to 18 percent of the students).

Table 27

PERCENTAGE OF TITLE I STUDENTS WITH EVIDENCED PATTERNS OF COMMUNICATION

	Communication Problem				
Grade	Bilingual	Aural perception	Nonstandard English	Lack of Verbal communication	Dialect
1	*	6	10	17	1
2	*	5	9	11	1
3	*	3	9	12	2
7	*	*	18	8	16

*Less than one percent.

Title I Student Background

Some of the information collected by the SIF gives a picture of previous educational experiences of the Title I student to help program planners structure the Title I program in a manner that is best suited to students enrolled. The descriptive information includes: 1) kindergarten experience; 2) grade retention; and 3) background of experiences.

As shown in Table 28, most of the students enrolled in the Title I program have had kindergarten experience. With the exception of the present seventh grade, more than 80 percent of the students enrolled in the Title I program are known to have had kindergarten experience.

Table 28

PERCENTAGE OF TITLE I STUDENTS WITH KINDERGARTEN EXPERIENCE (1979-80)

Grade	N	%
1	1,649	90
2	1,393	87
3	1,802	86
7	825	56

It is generally thought by practitioners in the field of education that children with kindergarten experience have experiences that tend to contribute to success in school. Although relatively large percentages of Title I students have had kindergarten experience, the rate of grade retention is also high. At least one out of every five students enrolled in the Title I program in grades one, two, and three is repeating his/her present grade, as shown in Table 29.

Table 29

THE NUMBER OF TITLE I STUDENTS REPEATING THE PRESENT GRADE
(1979-80)

Grade	Students repeating		Students not repeating		No response	
	N	%	N	%	N	%
1	510	28	1,279	70	48	3
2	393	25	1,117	70	89	6
3	385	18	1,594	76	125	6
7	183	12	1,211	82	82	6

Teacher responses indicate that almost a third of Title I students included in this report had experienced grade retention by the time they reached third and seventh grades. Table 30 provides a summary of the grade retention experience of Title I students.

Table 30

GRADE RETENTION OF TITLE I STUDENTS IN EARLIER GRADES
(1979-80)

Grade	Repeated earlier grades		Not repeated earlier grades		No response	
	N	%	N	%	N	%
1	192	10	1,564	85	82	5
2	400	25	1,089	68	110	7
3	634	30	1,315	63	155	7
7	460	31	857	58	159	11

Teachers were asked to indicate to what degree the background of Title I students enabled them to function successfully in the classroom. Teachers were asked to rate their responses on a continuum of low to high. The teacher responses, reported in Table 31, suggest that approximately 50 percent of the students functioned with moderate success, a third functioned with low success, and very few had backgrounds which prepared them to function with high success.

Table 31

SUMMARY OF TEACHER RATING OF TITLE I STUDENT BACKGROUND PREPARATION FOR SUCCESSFUL CLASSROOM EXPERIENCES BY GRADE (1979-80)

	Chances for classroom success					
	Low		Moderate		High	
Grade	N	%	N	%	N	%
1	731	40	854	47	133	7
2	573	36	753	47	95	6
3	700	33	1,025	49	138	7
7	459	31	829	56	94	6

APPENDIX A

Conversion to Normal Curve Equivalents

Any national assessment of program impact requires that the data from the numerous projects being evaluated be comparable.* Typically, local educational agencies enjoy generous autonomy in the selection of objectives, evaluation methodology, and instrumentation. Hence, the major logistical difficulty for a national evaluation team resides in aggregating various types of scores derived from different tests.

The normal curve equivalent (NCE) presents one solution to this dilemma. Two basic assumptions must, however, be satisfied in order to utilize this metric. First, the tests to be compared must measure, at least approximately, if not actually, the same sets of skills. Several recent research efforts such as the Anchor Test Study (Loret, Seder, Bianchini, and Vale, 1972) indicate that the intercorrelations among the eight most widely used reading achievement tests generally register 0.95 or better. Another study (Roudabush, 1975) shows that these results extend to comparisons between criterion-referenced (CRT) and norm-referenced (NRT) tests; this research effort found the correlation between a CRT and NRT to be equivalent to that between the two alternate forms of the NRT.

The second assumption which must be made relates to the implications and "generalizability" of gains in achievement test scores. Any two tests which purportedly measure a specific ability such as reading comprehension do not necessarily contain essentially identical items or objectives. Nonetheless, each test can be expected to contain a subset of items or objectives which do overlap with respect to the construct which they address. In order to use NCEs, an increase in the general ability measured by the two tests must be assumed

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*This appendix draws heavily from "The Normal Curve Equivalent: A Metric to Measure Instructional Project Impact," by Alice Chiang and Larry D. Rosen.

to be directly indicated by the gain represented in any subset of items or objectives claiming to measure that general ability.

The metric proposed by various researchers as well as by USOE is the NCE. It is a simple, standardized transformation similar to both a Z-score and a T-score. The NCE is distributed normally about a mean of 50 with a standard deviation of 21.06. To convert a raw score to an NCE, a Z-score is obtained using the following formula:

$$Z = \frac{X - \mu}{\sigma}$$

where X = observed or raw score;

μ = population mean; and

σ = population standard deviation.

The Z-score can then be easily transformed into an NCE by this operation:

$$NCE = (21.06)Z + 50$$

If the raw test scores can be translated into percentiles using appropriate tables supplied by the test publisher, then the NCEs representing the raw scores may easily be determined by using a conversion table of percentiles-to-NCEs such as Table B.1. There are also conversion tables available which list the NCE equivalent to every percentile ranging from 0.0 to 100.0 by increments of one-tenth.

Another method for translating percentiles to NCEs is to find the Z-score in a table (such as B.2) of the cumulative normal distribution for various standardized values. More extensive and precise tables can be found with numbers accurate to many decimal places; however, this table is suitable for the purposes of this discussion. A percentile is actually a decimal fraction with a base equal to 100. Hence, a percentile score of 24.2 percent is equivalent to 0.2420. Using a cumulative normal distribution table, we see that the area under the normal curve equal to 0.2420 corresponds to a Z-score of -0.70. This

Table B.1

Normal Curve Equivalent to Percentile Conversion Table

NCE	Percentile	NCE	Percentile	NCE	Percentile	NCE	Percentile
1	1.0	26	12.7	51	51.9	76	89.2
2	1.1	27	13.7	52	53.8	77	90.0
3	1.3	28	14.8	53	55.7	78	90.8
4	1.4	29	15.9	54	57.5	79	91.6
5	1.6	30	17.1	55	59.4	80	92.3
6	1.8	31	18.4	56	61.2	81	92.9
7	2.1	32	19.6	57	63.0	82	93.6
8	2.3	33	21.0	58	64.8	83	94.1
9	2.6	34	22.4	59	66.5	84	94.7
10	2.9	35	23.8	60	68.3	85	95.2
11	3.2	36	25.3	61	69.9	86	95.6
12	3.6	37	26.8	62	71.6	87	96.1
13	3.9	38	28.4	63	73.2	88	96.4
14	4.4	39	30.1	64	74.7	89	96.8
15	4.8	40	31.7	65	76.2	90	97.1
16	5.3	41	33.5	66	77.6	91	97.4
17	5.9	42	35.2	67	79.0	92	97.7
18	6.4	43	37.0	68	80.4	93	97.9
19	7.1	44	38.8	69	81.6	94	98.2
20	7.7	45	40.6	70	82.9	95	98.4
21	8.4	46	42.5	71	84.1	96	98.6
22	9.2	47	44.3	72	85.2	97	98.7
23	10.0	48	46.2	73	86.3	98	98.9
24	10.8	49	48.1	74	87.3	99	99.0
25	11.8	50	50.0	75	88.2		

Table B.2
Cumulative Normal Distribution

Z	Area	Z	Area	Z	Area
-3.25	.0006	1.00	.1587	1.15	.8749
-3.20	.0007	-0.95	.1711	1.20	.8849
-3.15	.0008	-0.90	.1841	1.25	.8944
-3.10	.0010	-0.85	.1977	1.30	.9032
-3.05	.0011	-0.80	.2119	1.35	.9115
-3.00	.0013	-0.75	.2266	1.40	.9192
-2.95	.0016	-0.70	.2420	1.45	.9265
-2.90	.0019	-0.65	.2578	1.50	.9332
-2.85	.0022	-0.60	.2743	1.55	.9394
-2.80	.0026	-0.55	.2912	1.60	.9452
-2.75	.0030	-0.50	.3085	1.65	.9505
-2.70	.0035	-0.45	.3264	1.70	.9554
-2.65	.0040	-0.40	.3446	1.75	.9599
-2.60	.0047	-0.35	.3632	1.80	.9641
-2.55	.0054	-0.30	.3821	1.85	.9678
-2.50	.0062	-0.25	.4013	1.90	.9713
-2.45	.0071	-0.20	.4207	1.95	.9744
-2.40	.0082	-0.15	.4404	2.00	.9772
-2.35	.0094	-0.10	.4602	2.05	.9798
-2.30	.0107	-0.05	.4801	2.10	.9821
-2.25	.0122			2.15	.9842
-2.20	.0139	0.00	.5000	2.20	.9861
-2.15	.0158			2.25	.9878
-2.10	.0179	0.05	.5199	2.30	.9893
-2.05	.0202	0.10	.5398	2.35	.9906
-2.00	.0228	0.15	.5596	2.40	.9918
-1.95	.0256	0.20	.5793	2.45	.9929
-1.90	.0287	0.25	.5987	2.50	.9938
-1.85	.0322	0.30	.6179	2.55	.9946
-1.80	.0359	0.35	.6378	2.60	.9953
-1.75	.0401	0.40	.6554	2.65	.9960
-1.70	.0446	0.45	.6736	2.70	.9965
-1.65	.0495	0.50	.6915	2.75	.9970
-1.60	.0548	0.55	.7088	2.80	.9974
-1.55	.0606	0.60	.7257	2.85	.9978
-1.50	.0668	0.65	.7422	2.90	.9981
-1.45	.0735	0.70	.7580	2.95	.9984
-1.40	.0808	0.75	.7734	3.00	.9987
-1.35	.0885	0.80	.7881	3.05	.9989
-1.30	.0968	0.85	.8023	3.10	.9990
-1.25	.1056	0.90	.8159	3.15	.9992
-1.20	.1151	0.95	.8289	3.20	.9993
-1.15	.1251	1.00	.8413	3.25	.9994
-1.10	.1357	1.05	.8531		
-1.05	.1469	1.10	.8643		

Z-score is then substituted in the previous formula to yield the NCE:

$$NCE = (21.06)\ (-0.70) + 50 = 35.3$$

Percentile scores can also be ascertained when NCEs are known. One method is to convert the NCE back to a Z-score using this formula:

$$Z = \frac{NCE - 50}{21.06}$$

The percentile equivalent to the NCE and Z-score may then be found by using a table containing normal standardized values or Z-scores and the cumulative area under the curve represented by each of these values (see Table B.2). To illustrate the usage of the Z-score table, assume that it is desirable to convert two NCEs--23.7 and 67.8--to percentiles. First, convert the NCEs to Z-scores:

$$Z_1 = \frac{23.7 - 50}{21.06} \qquad Z_2 = \frac{67.8 - 50}{21.06}$$

$$= \frac{-26.3}{21.06} \qquad = \frac{17.8}{21.06}$$

$$= -1.25 \qquad = 0.85$$

Next, the area under the curve for each Z-score is read from Table B.2; this area is equal to a percentile expressed as a decimal fraction. The area for Z_1 is 0.1056; for Z_2 is 0.8023. This means that the NCE = 23.7 is equivalent to a percentile score of 10.56 percent; NCE = 67.8, to a percentile score of 80.23 percent. When greater precision is desired in the Z-score values, simply use a table with more precise values for Z.

Another way to determine the percentile score equivalent to an NCE is to use a conversion table for NCEs-to-percentiles such as Table B.3. More precise tables such as this are also available, with NCEs ranging from 1.0 to 99.0 in increments of one-tenth.*

*For both precise conversion tables listing NCEs and percentiles, see Chiang and Rosen, Appendices A and B.

Table B.3

Percentile to Normal Curve Equivalent Conversion Table

NCE	Percentile	NCE	Percentile	NCE	Percentile	NCE	Percentile
1	1.0	26	36.5	51	50.5	76	64.9
2	6.7	27	37.1	52	51.1	77	65.6
3	10.4	28	37.7	53	51.6	78	66.3
4	13.1	29	38.3	54	52.1	79	67.0
5	15.4	30	39.0	55	52.6	80	67.7
6	17.3	31	39.6	56	53.2	81	68.5
7	18.9	32	40.1	57	53.7	82	69.3
8	20.4	33	40.7	58	54.2	83	70.1
9	21.8	34	41.3	59	54.8	84	70.9
10	23.0	35	41.9	60	55.3	85	71.8
11	24.2	36	42.5	61	55.9	86	72.8
12	25.3	37	43.0	62	56.4	87	73.7
13	26.3	38	43.6	63	57.0	88	74.7
14	27.2	39	44.1	64	57.5	89	75.8
15	28.2	40	44.7	65	58.1	90	77.0
16	29.1	41	45.2	66	58.7	91	78.2
17	29.9	42	45.8	67	59.3	92	79.6
18	30.7	43	46.3	68	59.9	93	81.1
19	31.5	44	46.8	69	60.4	94	82.7
20	32.3	45	47.4	70	61.0	95	84.6
21	33.0	46	47.9	71	61.7	96	86.9
22	33.7	47	48.4	72	62.3	97	89.6
23	34.4	48	48.9	73	62.9	98	93.3
24	35.1	49	49.5	74	63.5	99	99.0
25	35.8	50	50.0	75	64.2		

As Chiang and Rosen point out, whatever common metric is utilized by researchers evaluating data from numerous projects, it must possess four qualities:

- **Interpretability.** It must be meaningful and easily grasped by all groups of information users.
- **Sensitivity.** It should discriminate even small differences in pre-post scores.
- **Commonality.** The mean, variance, and distribution must be standardized across all tests.
- **Equal interval.** Any consecutive scale units should be an equal distance apart at any point on the continuum of the scale.

The NCE does enjoy all four of these characteristics. It is more interpretable than stanines and Z-scores; more sensitive than percentiles and stanines; is comparable across all tests, unlike grade equivalent and raw scores; and has an equal interval scale, unlike raw scores, grade equivalents and percentiles.

In order to utilize NCEs appropriately, the researcher must never compare scores derived from tests which were normed on different populations. Fortunately, most widely used standardized achievement tests are normed on what may be called a "representative" sample of the national population. Hence, NCEs for these tests can probably be compared safely with little concern for the equivalence of the various norming samples. In fact, the Anchor Test Study (Loret, et.al., 1975) indicated that the normative samples from the national population used by major test publishers are similar:

When using tests normed on a national sample, the NCEs indicate achievement relative to the national norm. Similarly, when using tests normed on some local sample, NCEs actually describe differences in achievement as compared to the local median in terms of the local variance. However, "local" NCEs are not

parable to "national" NCEs, since they represent scores on tests using different norming populations.

NCE gain scores can be estimated from locally normed scores (for example, criterion-referenced test scores) and then used to compare with NCEs derived from nationally normed scores. The NCE gain is calculated using this formula (Chiang and Rosen, p. 10):

$$NCE = 21.06 \quad \frac{\bar{Y} - \hat{\bar{Y}}}{S_{LOCAL}} * \frac{S_{NRT}}{\sigma_{NRT}}$$

where $\bar{Y}$ = mean posttest score for treatment group;

$\hat{\bar{Y}}$ = mean posttest score for no-treatment or control group;

σ_{NRT} = national population standard deviation on a norm-referenced test, given in the test publisher's technical manual;

S_{NRT} = sample group's standard deviation on the same norm referenced test; and

S_{LOCAL} = sample group's standard deviation on the locally normed test.

The basis for this equation requires the assumption that the ratio between the sample group variance and the national population variance on a norm-referenced test should be equivalent to the ratio between the sample group variance and the national population variance on a locally normed test. In addition, the correlation between the norm-referenced and the locally normed tests must be high, thereby indicating that they are measuring approximately the same thing. Current research (Roudabush, 1975) indicates that this procedure is at least reasonable.